

REMARKS

Claims 1-27 are pending in the application. Claims 1, 8, 14, and 22 are independent. No claims have been amended, canceled, or added.

Rejection of Claims 1-21 Under 35 U.S.C. § 103(a)

In the Office Action, the Examiner rejected claims 1-21 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,174,748 B1, to Jeon et al. (hereinafter “Jeon”) in view of U.S. 6,030,540 to Yamamoto et al. (hereinafter “Yamamoto”). To establish a *prima facie* case of obviousness, an Examiner must show three things: (1) that there is some suggestion or motivation to modify a reference or combine reference teachings to arrive at the claimed invention, (2) that there must be a reasonable expectation of success, and (3) that the references teach or suggest each and every element of the claimed invention. (MPEP §2143). Applicant respectfully traverses the rejection.

Representative independent claim 1 recites in pertinent part “*a buried tapered waveguide* disposed in a semiconductor layer; and *a tapered rib waveguide* disposed in the semiconductor layer proximate to the buried tapered waveguide” (emphasis added). In other words, claim 1 recites *two separate tapered waveguides* disposed in a semiconductor layer.

In the Office Action, the Examiner states that Jeon teaches a buried tapered waveguide (14A) and a tapered rib waveguide (no reference number), both disposed in a semiconductor layer (10).” Applicant respectfully disagrees with the Examiner’s characterization of Jeon.

Jeon appears to be directed to a high power laser diode. In Jeon, the laser diode appears to have *a single waveguide structure* (25), containing lower waveguide layer (22), etch stop layer (23), and upper waveguide layer (24), surrounded by upper cladding (28) and lower cladding (20). Applicants respectfully submit that Jeon therefore does not teach or fairly suggest two separate waveguides.

Assuming for the sake of argument that Jeon therefore does not teach or fairly suggest two separate waveguides, in that lower waveguide layer (22) and upper waveguide layer (24)

might be characterized as two separate waveguides, Applicants respectfully submit that Jeon does not teach or fairly suggest two separate *tapered* waveguides. That is, although upper waveguide layer (24) appears to be tapered (14A), lower waveguide layer (22) is not tapered. Thus, Applicants respectfully submit that the interpretation that Jeon teaches two separate tapered waveguides is incorrect.

Independent claim 1 recites further in pertinent part “wherein an optical beam is *directed into a larger end* of the buried tapered waveguide and the tapered rib waveguide, the buried tapered waveguide tapered to guide the optical beam therethrough into the slab portion of the rib waveguide” (emphasis added).

In the Office Action, the Examiner states that “As to the direction of the input light, Jeon teaches the apparatus as bidirectional wherein the coupling of input light is dependent on whether the user wishes to transform a large mode to a single mode or vice versa.” Applicants respectfully disagree with the Examiner.

Jeon specifically provides at column 6, lines 9-16 “Device 10 may be a semiconductor laser structure or other active medium device where generated *light* occurring under lasing conditions is formed in an active lasing section 12, *propagates through a tapered section 14* where the propagating mode *then* undergoes expansion and transformation in *passive waveguide section 16*” (emphasis added). That is, light in Jeon travels from the narrow section (12) through middle section (14) and out the wide section (16). Applicants respectfully submit that Jeon does not teach or suggest that light travels in any other direction and respectfully requests that if the Examiner is to maintain this position that the Examiner direct Applicants to the specific teaching in Jeon.

Applicants respectfully submit that Yamamoto fails to make up for the deficiencies in Jeon. For example, Yamamoto does not teach or fairly suggest “*a buried tapered waveguide*” and “*a tapered rib waveguide*” as recited in claims 1, 8, and 13. Accordingly, Applicants respectfully submit that Jeon and/or Yamamoto either separately or in combination fail teach or suggest each and every element of claims 1, 8, and/or 13. Applicants respectfully submit

therefore that claims 1, 8, and/or 13 are not obvious in light of Jeon in view of Yamamoto. Because claims 1, 8, and/or 13 are not obvious in light of Jeon in view of Yamamoto, Applicants respectfully submit that claims 1, 8, and/or 13 are patentable over Jeon in view of Yamamoto and respectfully requests that the Examiner reconsider and remove the rejection to claims 1, 8, and/or 13.

Claims 2-12 properly depends from claim 1, which Applicants respectfully submit is patentable over Jeon in view of Yamamoto. Claims 14-21 properly depends from claim 13, which Applicants respectfully submit is patentable over Jeon in view of Yamamoto. Accordingly, Applicants respectfully submit that claims 2-12 and 14-21 are patentable for at least the same reasons that claims 1 and 13, respectively, are patentable. (MPEP §2143.03 (citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)). Accordingly, Applicant respectfully requests that the Examiner reconsider and remove the rejection to claims 1-21.

Rejection of Claims 22-27 Under 35 U.S.C. § 103(a)

In the Office Action, the Examiner rejected claims 22-27 under 35 U.S.C. § 103(a) as being unpatentable in light of Jeon in view of Yamamoto in further view of U.S. Patent Application No. 2003/0031443 to Soljacic et al. (hereinafter “Soljacic”). Applicant respectfully traverses the rejection.

In the Office Action, the Examiner states that Jeon teaches “a mode converter comprising a semiconductor substrate having dual tapered waveguides wherein there are regions of tapering having different tapering rates such that multimode signal can be converted to single mode signal and vice versa.” Applicants respectfully disagree with the Examiner.

As discussed above, the laser diode in Jeon appears to have *a single waveguide structure* (25), containing lower waveguide layer (22), etch stop layer (23), and upper waveguide layer (24), surrounded by upper cladding (28) and lower cladding (20). Applicants respectfully submit that Jeon therefore does not teach or fairly suggest two separate waveguides. Moreover, Jeon does not teach or fairly suggest two separate *tapered* waveguides. That is, although upper waveguide layer (24) appears to be tapered (14A), lower waveguide layer (22) is not tapered.

Yamamoto does not make up for the deficiencies in Jeon in that Yamamoto does not teach or fairly suggest a buried tapered waveguide and a tapered rib waveguide as recited in claim 22. Accordingly, Applicants respectfully submit that Jeon and/or Yamamoto either separately or in combination fail teach or suggest each and every element of claim 22. Applicants respectfully submit therefore that claim 22 is not obvious in light of Jeon in view of Yamamoto. Because claim 22 is not obvious in light of Jeon in view of Yamamoto, Applicant respectfully submits that claim 22 is patentable over Jeon in view of Yamamoto and respectfully requests that the Examiner reconsider and remove the rejection to claim 22.

Claims 23-27 properly depends from claim 22, which Applicants respectfully submit is patentable over Jeon in view of Yamamoto. Accordingly, Applicant respectfully submits that claims 23-27 are patentable for at least the same reasons that claim 22 is patentable. (MPEP §2143.03 (citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988))). Accordingly, Applicant respectfully requests that the Examiner reconsider and remove the rejection to claims 22-27.

CONCLUSION

Applicants submit that all grounds for rejection have been properly traversed, accommodated, or rendered moot, and that the application is in condition for allowance. The Examiner is invited to telephone the undersigned representative if the Examiner believes that an interview might be useful for any reason.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN

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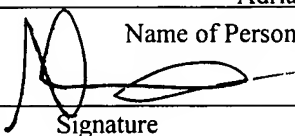
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